



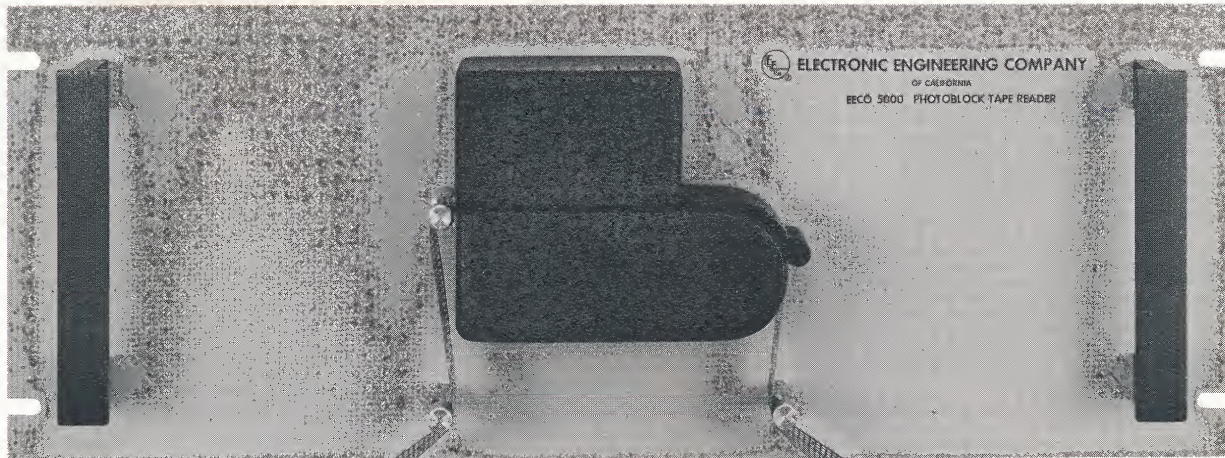
EECO 5000

JULY 1966

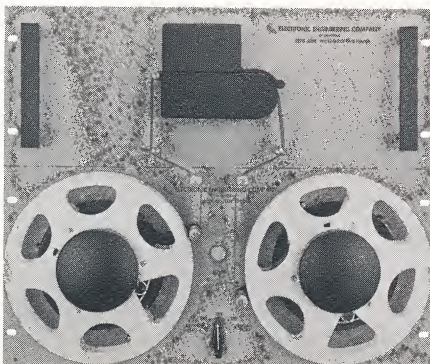
REVISED

PHOTOBLOCK READERS

— up to 320 bits per block

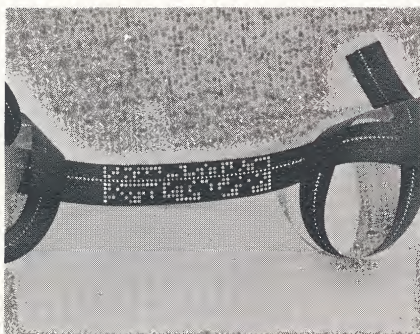


EECO 5000 Photo Block punched tape reader

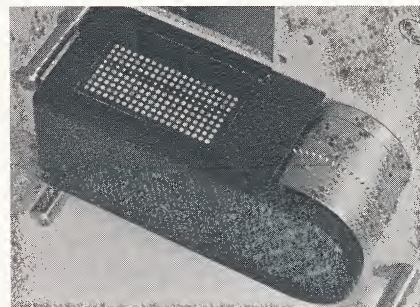


EECO 5000 Reader with EECO 400 Tape Spooler

- ◆ up to 12 blocks (or frames) per second
- ◆ all solid state drive — no clutches, ratchets or solenoids
- ◆ all silicon transistors
- ◆ up to 2 amp output switching transistors



40 line block of punched tape (320 bits)



Photodiodes in read head

EECO 5000 Photo Electric Block Reader

EECO 5000 Block Readers are available with:

- ◆ Block sizes from 5 to 40 lines of eight bits each—
which is 40 to 320 bits per block.
- ◆ A variety of output circuits
all using silicon switching transistors.
Current capacities range from 100 ma to 2 amps.
- ◆ Outputs can be used for:
 - operating relays or solenoids
 - providing logic levels
 - energizing visual indicators

The tape is read by detecting the light through the tape holes using silicon light-sensitive photodiodes—one for each bit.

The output of each diode is buffered with a silicon transistor amplifier terminating in a silicon switching transistor.

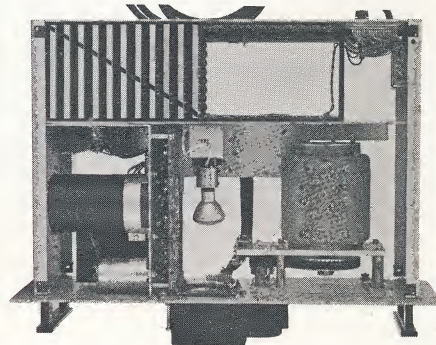
Outputs are gated off during tape advance. Tape can remain in the read position indefinitely with full current flowing through the output switching transistors.

The tape drive motor is transistor controlled. The motor electrodynamically positions the tape for reading. There are no ratchets, solenoids or relays, except for the relay used to reverse the motor in the bidirectional models.

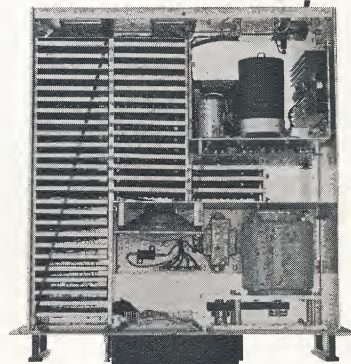
The tape is advanced from block to block on the receipt of external pulse commands.

There are two modes of tape drive—STEP and SLEW. In the STEP mode, an external pulse triggers the drive circuit, which moves the tape one frame. In the SLEW mode, the tape runs at full speed without readout.

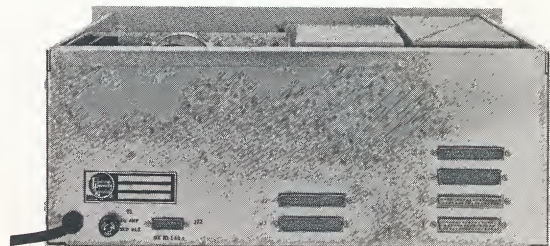
Block tape readers are an economical method of programming automatic test equipment, process control, machine tool control, etc.—wherever more information is required than can be obtained from a single line punched tape reader and a buffer memory is not justified.



Top View EECO 5110
— 10 line reader



Top View EECO 5140
— 40 line reader



Rear View EECO 5130
— 30 line reader

SPECIFICATIONS EECO 5000

Model Numbers*	Block Size	Nominal Advance Time (ms/Block)	Step Rate (Blocks/sec.)
EECO 5105	5 line, 40 bits	85	0 - 12
EECO 5110	10 line, 80 bits	125	0 - 8
EECO 5112	12 line, 96 bits	125	0 - 8
EECO 5115	15 line, 120 bits	165	0 - 6
EECO 5120	20 line, 160 bits	200	0 - 5
EECO 5130	30 line, 240 bits	320	0 - 3
EECO 5140	40 line, 320 bits	400	0 - 2½

*Add a "B" to the model number for bidirectional operation.

Special block sizes can be supplied.

Output amplifiers are on plug-in circuit cards — generally with eight amplifiers on each card. Changing the output circuit usually requires only inserting a different circuit card.

OPERATING MODES

Step Mode An external switch closure selects STEP Mode. This may be permanently jumpered externally if the SLEW Mode (see below) is not required.

Step Command is a positive-going pulse or level change. This advances the reader one block. The pulse may be produced by a mechanical or transistor switch closure.

Amplitude Positive-going pulse or level change of $20V \pm 10V$. This may be from an external source or may be produced by a mechanical or transistor switch closure to the +25V source in the reader.

Duration 20 microseconds minimum

Rise Time 10 microseconds maximum

Input Impedance 1000 ohms in series with .0047 mfd shunted by 100 K ohms to ground.

Slew Mode The SLEW Mode is selected when the external switch referred to under STEP INPUT Mode is open. A "Step Command" pulse starts the tape motion which continues until the external switch is closed. There is no readout in the SLEW Mode. The tape speed is the same as in the STEP Mode.

FRAME TRANSFER SIGNAL

An output signal indicates the tape is advancing between frames (or blocks) and that all outputs are gated to the "no hole" condition. In models with Positive Output Levels, the FRAME TRANSFER SIGNAL has the following characteristics:

Frame Transferring $+0.2 \pm 0.2$ vdc. Maximum loading is 100 milliamps from a positive maximum external voltage of +40 vdc.

Frame Not Transferring 25 ± 1 vdc with a source impedance of 1000 ohms. Maximum external load to ground is 100 ohms.

In Models with Negative Output Levels, the FRAME TRANSFER SIGNAL has the following characteristics:

Frame Transferring -0.2 ± 0.2 vdc. Maximum loading is 100 milliamperes from a maximum external voltage of -25 vdc.

Frame Not Transferring -25 ± 1 vdc with a source impedance of 1000 ohms. Maximum external load to ground is 100 ohms.

FORWARD/REVERSE

Normal operation is for the tape to run from left to right; however, models can be furnished which will operate in both directions (designated by a "B" following the model number). Closure of an external switch reverses the tape motion (right to left) for both STEP and SLEW modes.

LIGHT SOURCE

The light source is a single lamp. Life is in excess of 5000 hours when reader is operated from 117V line.

TAPE

Standard 1-inch wide, 8-level paper-mylar or metalized-mylar tape having opacity of 95% or greater should be used. Thicknesses of 0.0030" to 0.0045" are recommended. Code hole spacing on 0.1-inch centers. (EIA Standard RS-227).

Models can be furnished to read paper tape with opacity of about 50% at slightly extra cost.

TAPE DRIVE

A transistor-controlled dc motor drives the tape. There are no mechanical clutches, brakes, or solenoids. Tape is positioned by a sprocket wheel. Reading diodes are physically protected by a glass plate. The tape is not clamped, and is in contact only with smooth glass or polished metal.

ELECTRICAL INTERFERENCE

Diode output is high level, which eliminates false reading in the presence of high levels of RFI or from powerline transients. As there are no contacts or relays in the EECO 5000 (except a reversing relay), there is virtually no radiated RFI.

MAINTENANCE

No regular maintenance or lubrication is required. The life of the drive belt is in excess of 10,000 hours.

POWER

105/125 vac or 210/250 vac 50-400 Hz 200 watts

PHYSICAL

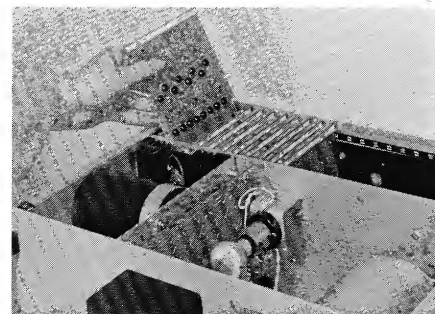
7" high — 19" wide — 13" deep behind front panel including the connectors (Except that 30- and 40-line units models 5130 and 5140 are 20" deep.) Weight: 30 lbs. approx.

ENVIRONMENT

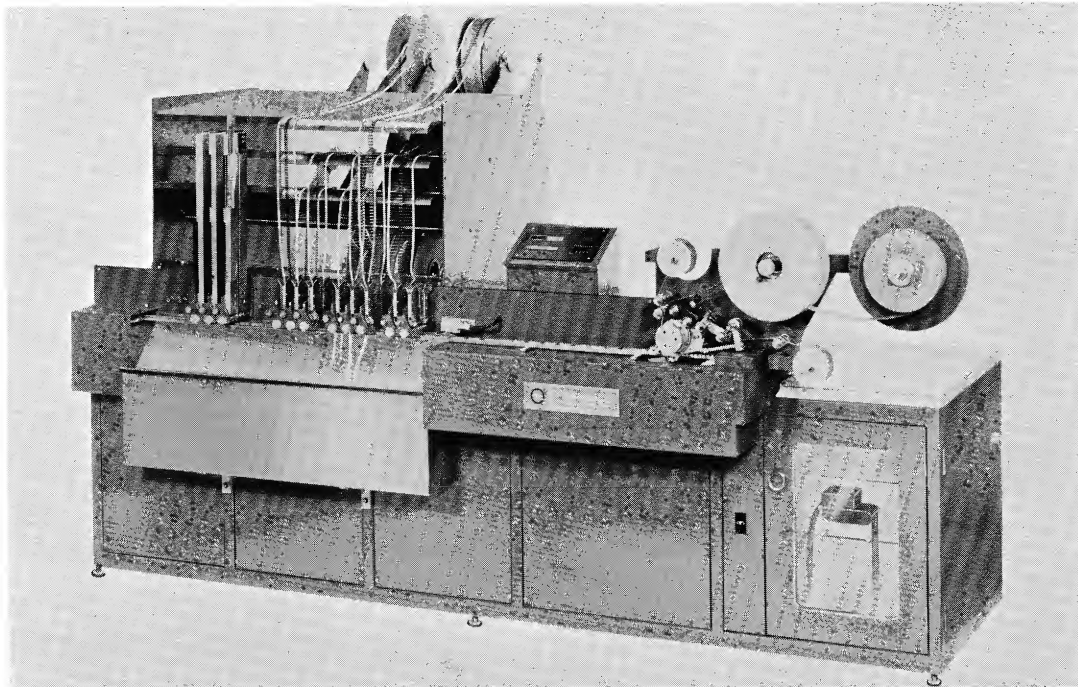
10°C to +40°C (50°F to 104°F).

CONNECTORS

All inputs and outputs are made with Cannon "D Series" connectors on the rear panel. All mating connectors are supplied.

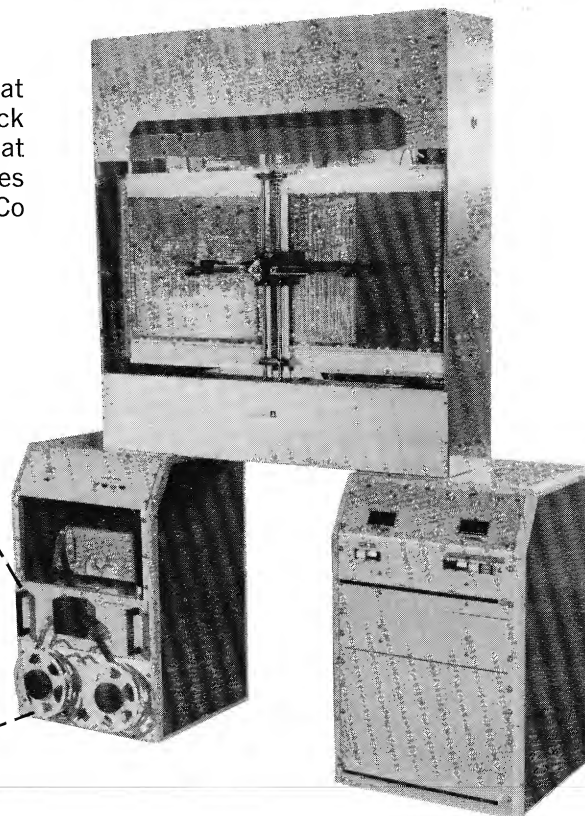
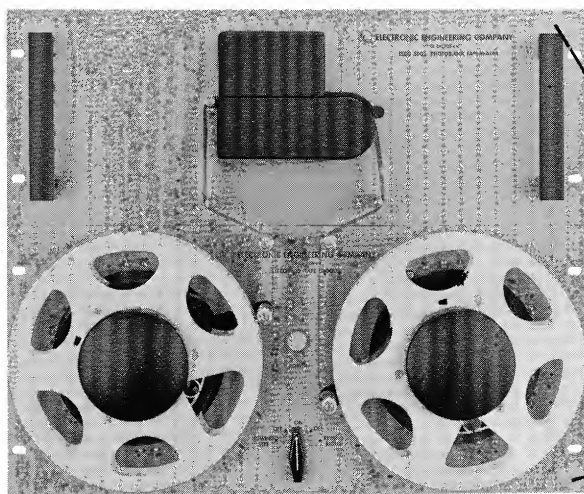


Circuit card with eight Silicon amplifiers and eight Silicon output switching transistors.



The EECo 5000 series photoblock reader is used by Universal Instruments Corp. of Binghamton, N.Y. to program this "bulk drop" component sequencer. Up to 40 reels of individual axial lead components are reassembled in the proper sequence on a new multiple component reel. The new reel is then used on another tape programmed machine to automatically insert the components into a printed circuit board.

The Arvin Systems multilayer board Tester shown at right is programmed by EECo's 5000 series block reader. Each board has 15,960 points to be tested at the rate of 28,800 tests per hour. The 5000 Series block reader is used in conjunction with the EECo TS400 tape spooler, both shown below.



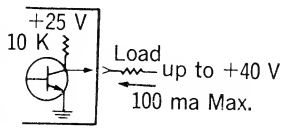
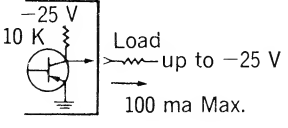
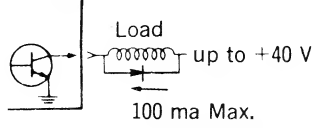
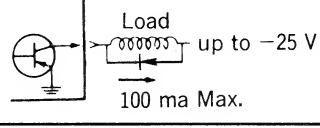
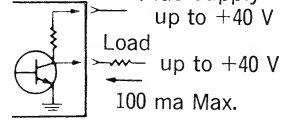
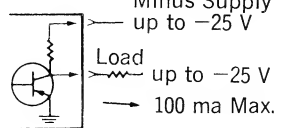
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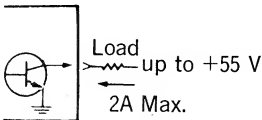
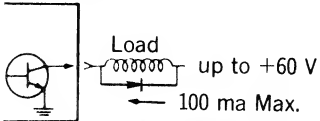
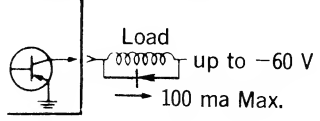
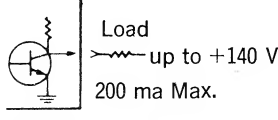
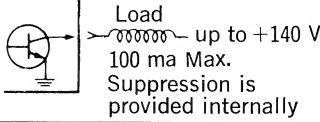
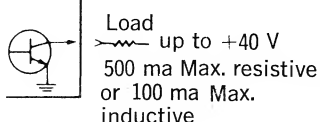
5000 SERIES PHOTOBLOCK READER

STANDARD OUTPUT CIRCUITS

	Option Type	"Hole" Condition	"No Hole" Condition	Circuit
Logic level output with plus level for "no hole" condition.	STD	$+0.2 \pm 0.2$ Vdc	$+25 \pm 1$ Vdc (No load)	
Logic level output with plus level for "hole" condition.	A	$+25 \pm 1$ Vdc (No load)	$+0.2 \pm 0.2$ Vdc	
Logic level output with negative level for "no hole" condition.	D	-0.2 ± 0.2 Vdc	-25 ± 1 Vdc (No load)	
Logic level output with negative level for "hole" condition.	C	-25 ± 1 Vdc (No load)	-0.2 ± 0.2 Vdc	
Relay or solenoid drive with ON for "hole" condition with plus polarity external voltage.	B	ON	OFF	
Relay or solenoid drive with ON for "hole" condition with negative polarity external voltage.	E	ON	OFF	
Clamped Logic level output with plus level for "no hole" condition	F	$+0.2 \pm 0.2$ Vdc	External Supply Voltage (+40 V Max.)	
Clamped Logic level output with plus level for "hole" condition	G	External Supply Voltage (+40 V Max.)	$+0.2 \pm 0.2$ V	
Clamped logic level output with minus level for "no hole" condition.	H	-0.2 ± 0.2 Vdc	External Supply Voltage (-25 Vdc Max.)	
Clamped logic level output with minus level for "hole" condition	J	External Supply Voltage (-25V Max.)	-0.2 ± 0.2 Vdc	

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SPECIAL OUTPUT CIRCUIT OPTIONS AVAILABLE AT EXTRA COST				
	Option Type	"Hole" Condition	"No Hole" Condition	Circuit
Plus High current Switch *See note below	L	$+1.0 \pm 1.0 \text{ Vdc}$	External Supply Voltage (+55V Max.)	
Plus High voltage relay driver	M	ON	OFF	
Minus High voltage relay driver	N	ON	OFF	
Plus High voltage driver	R	$+0.5 \pm 0.5 \text{ Vdc}$	External Supply Voltage (+140 V Max.)	
Plus High voltage relay driver	S	ON	OFF	
Plus High current switch	T	$+0.75 \pm 0.5 \text{ Vdc}$	External Supply Voltage (+40 V Max.)	

Additional options available include:

- (1) Storage registers with remote interrogation and reset commands.
- (2) Selective interrogation of individual characters in the block.
- (3) Mixed options in the same reader.

*NOTE:

Forced Air cooling required if more than 24 bits are to be on at 2A for 30 Min. or longer. Max. block size 20 lines. (160 bits)



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